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Selecting and Commissioning Building Automation Systems.

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Selecting a direct-digital-control (DDC) or building-automation system that achieves quality control for air-conditioning and energy is very much dependent upon the design intent and the process used for selecting the design requirements. This includes determining energy-efficiency goals, energy-management needs, comfort and indoor air-quality requirements, and operational objectives. Most DDC systems will also have requirements for security and fire protection.

In addition, today's building owners desire that productivity enhancements and environmental features be incorporated into the building intelligence system.

The best way to achieve all these goals--and ensure owner and occupant satisfaction--is to use a quality process. The Commissioning Process developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Guideline 1-1996, is the best consensus approach available. In addition, the National Institute of Building Sciences (NIBS) has formed a committee to develop the concept of "total building commissioning," which includes all aspects of the building: envelope, roofing, fire and life safety, plumbing, and structure. This is expected to enhance the implementation rate of the ASHRAE guideline.

KEYS TO BAS COMMISSIONING

An early understanding of the owner's needs through workshops, surveys, and interviews is important. Workshops should involve facility managers, operations and maintenance personnel, service contractors, and even occupants and end-user "interest groups," such as customers in the case of retail stores, patients in the case of hospitals, and students for schools.

The goal is to identify building environmental, safety, and health issues early through a quality consensus process.

Even with the best commissioning structure in place, designing and building a DDC system with the best hardware and software is by no means easy. A good building-automation system (BAS) always requires a quality design team, knowledgeable contractors, a top-notch vendor, and a fully trained operating team.

Beyond defining basic DDC system needs, building owners and operators must now sift through the issues of functionality and interoperability and how they relate to such technologies as the LonWorks and BACNet protocols, Ethernets, nodes, field panels, and intelligent devices. Each year, it seems, the terminology and landscape of building control become more complex and convoluted for the end-user. While DDC software and communications are improving the capability and options available, these opportunities are often lost.

In most cases, the primary source of failure or confusion is inadequate time taken by the building owner and the design team to properly

select, design, install, and operate a new DDC system.

FROM BAS PROJECT CONCEPTION

Ideally, the commissioning process of a DDC system begins at project conception and proceeds through at least one year of operation. It is best achieved with a commissioning team, led by a designated commissioning authority. These measures ensure that the owner's design intent is maintained throughout the project and is conveyed to the system operators.

The primary steps in the commissioning process, listed on page 26, are critical to success.

- * Develop owner's design intent. Suitable DDC systems are the result of development, documentation, and revision as required of the owner's design intent. While this is often completed as a cursory step in the project development, it is better to follow a comprehensive process bringing the commissioning authority and system designer detailed and accurate information on DDC system needs. This process should include information on the use of the system and the requirements for final system testing.

Experience in this arena has shown that a workshop format with all system and occupant users present is the most effective format for developing the design intent. The system users group should include the building owner, operations and maintenance staff, information technology (IT) staff, building occupants and visitors, the architects and engineers, and contractors and vendors, when known.

For example, the attendees at an owner's workshop for a school can include the principal, financial officer, secretary, teachers, operations and maintenance staff, an IT representative, and even students and parents.

The workshop should be structured to promote participant interaction through both individual responses and group discussion. A workshop facilitator is needed to develop questions focusing on the intended use, operation, and interaction of the DDC system relative to other support systems, end-user interaction, and available budgets. Typical questions include:

- * What is the intent of the building?
- * Is there an existing local-area network (LAN) or wide-area network (WAN) to serve as the system backbone?
- * What are comfort, IAQ, safety, and productivity issues?
- * What is the primary motivation for installing the DDC system, economics or performance?
- * What equipment or systems will be controlled? Will the implementation be phased?
- * What level of precision or control resolution is needed?
- * What control-sequence standards (by system type) will be used?
- * What terminology and labeling standards apply?
- * What software or hardware interfaces will be necessary?
- * What control over future costs is required?
- * Is future interoperability or interchangeability important?
- * What data-reporting capabilities are required?
- * How will the success of the project be measured?

And perhaps most importantly:

- * What level of in-house expertise is desired?

Using the information discussed and prioritized in the owner's workshop, the key criteria the DDC system must meet can be documented. This provides the roadmap from which to design the DDC system and for selecting both a vendor and a design team.

- * Develop commissioning plan and specifications. To aid in the proper selection of a contractor/vendor, a commissioning plan and specifications are vital. The primary purpose of the commissioning plan is to detail what is expected of the contractor and how the system installation and operations will be evaluated to ensure the owner's design intent has been met. Also included are verification checklist forms to be used, and a description of the roles and responsibilities of each commissioning team member.

The specifications contractually formalize the commissioning requirements, detailing tests to be performed by the contractor and recourses for failed tests. The specs must also outline the requirements

for preparing and submitting vendor qualifications.

* Select contractor/ vendor. Selecting the proper contractors and vendors is critical to the long-term success of the DDC system. A tried and true process is to pre-select three or more contractor/ vendors and request qualification packages (see sidebar on page 25), which include company and personnel information, related project experience, and descriptions of proposed systems.

A panel--typically composed of the design engineer, owner representative, operations and maintenance personnel, IT staff members, the commissioning authority, a financial staff member, and a representative of the building occupants--reviews the information obtained from contractors and vendors. Each member rates the submissions using a form developed during the previous phase; scores are tallied, and the top one to three vendors and their local contractors are invited for interviews.

The interview is an opportunity to discuss the contractor's submission, qualifications, and understanding of the job. It allows the panel to judge the ability of vendor systems to meet the owner's design intent. Once again, each voting member rates the presentation, and the group achieves a consensus as to which vendor/contractor will be allowed to negotiate the installation cost. If an agreeable cost cannot be reached, then the next vendor/contractor would be contacted for negotiations.

* Complete verification testing. Verification testing is a quality review of the contractor's design and installation of the DDC system. Three key elements that need to be verified are the hardware, the control logic, and communication.

Typically, the contractor is provided checklists to be completed throughout the design and installation of the system. The design engineer of record and the commissioning authority periodically review the information on these checklists for accuracy and quality. Using statistical sampling, the commissioning authority is able to check a small percentage (5 to 30 percent) of the system components, control logic performance, and communication in great detail to determine if the contractor is achieving the desired quality and meeting the owner's design intent.

The key information covered during verification testing includes: sensor installation and calibration; controlled device installation and calibration; database compliance with control sequences; communication of alarms, messages, and data; functionality of all remote communications; record drawings of hardware installation; label consistency (computer, drawings, components); and documentation of control logic.

If it is found that the system design or installation is not of sufficient quality or functionality, it is the responsibility of the contractor to go through the entire design and installation to re-verify each part and point.

This is a major incentive for the contractor to do it right the first time.

* Complete functional performance testing. Once it has been determined that the system has been installed properly and has been adequately started up, the commissioning authority--in coordination with the design engineer and owner's operating staff--should direct the contractor to complete functional testing of the system. Functional testing essentially runs the DDC system through its various modes of operation, and documents the resultant effect on the building. This includes the position and operation of dampers, valves, and other system components.

Typical testing regimens cover a number of modes of operation and may comprise: Occupied, unoccupied, morning warm-up/cool-down, night setback/setup, emergency mode (response to input from fire-control system), response to psychrometric or equipment failure alarms, lead/lag rotations, loss of power (re-startup), and response to loss of WAN or LAN communications.

If the system fails to operate according to the owner's design intent, then the contractor is responsible for fixing and retesting. One of the key areas of interest during functional testing is how the system responds to step changes in setpoint. If the system is stable, then it will quickly adjust to the new value; however, if there are control errors and

setup problems, the system could be unstable and take a long time to settle out. It is important during this phase that functional performance tests are not implemented to show operations that are not representative of typical conditions.

* Develop a systems manual.

In parallel with the design and installation of the DDC system, requirements for the system manual must be developed.

Unlike typical operations and maintenance manuals--which are difficult to use and are component based--a systems manual generated during the commissioning process focuses on the operation of the system as a whole. The interactions between the components, and the optimization of system operation, are key sections within the manual. The DDC system and other building components should be described in both lay and technical terms. Full documentation of the control logic is critical (see Figure 2 on page 26).

A key aspect of a successful systems manual is that the information is tailored just for the components and DDC system installed. All too often, vendors deliver nothing but a standard operations and maintenance manual containing information on many different components when only some are actually installed. The best reason to develop a customized systems manual is to reduce the amount of useless information and eliminate confusion when trying to troubleshoot and optimize the system.

* Complete operator and user training. Operator and user training is accomplished throughout the installation and start-up of the DDC system. This enables the contractor to receive feedback on such issues as maintainability, accessibility, and ease of use before all of the work is completed--reducing change orders and additional work.

Detailed training is also phased over the first year of operation, enabling users to become familiar with the system and ask specific questions on system optimization. A given training plan may call for four to five sessions, with the later classes primarily being question-and-answer, interactive sessions.

It is recommended that training be undertaken by professionals; having the project engineer or manager "brief the system operation" is hardly effective. In addition, each phase of training should conclude with a means for measuring training effectiveness.

The content of the training plan will be very dependent on the owner's predetermined concept of system operations. If heavy reliance on the vendor after the installation is the plan, then the training requirements are reduced accordingly. If the owner desires independence, then the training requirements will be more extensive. Any material to be used should be planned and submitted by the contractor to the commissioning authority for approval before training to ensure that the information is at the proper level for the attendees and that it focuses on the actual system installed.

As a final level of quality control for the training, the commissioning authority can quiz operators on random aspects of the system prior to occupancy and during the first year of operations.

* Accomplish ongoing system optimization. For any DDC system to be a success, the operating staff must undertake and complete ongoing optimization. To aid in this process, the commissioning authority is involved through the first year of operation to ensure the operating staff understands the original design intent and the impacts of potential changes.

In summary, it is important to have a quality process that involves all parties and that is started early to prevent decision-making after design is started or construction is underway. The commissioning process is the best available process for achieving owners' needs while independently evaluating and verifying DDC systems.

RFQs for BAS

Selecting a contractor for a building-automation system should begin with a request for qualifications (RFQ). The RFQ should ask for complete, useful information on bidding contractors and vendors. Critical information items include:

* Company description and history.

* Three reference projects of similar scope and system type.
* Qualifications of lead technician, project manager, and application engineer.
* Qualifications of subcontractors.
* Training available for system.
* Proposed training plan to achieve owner's operating intent.
* How their system will meet the owner's design intent.
* Past experience with the commissioning process.
* Detailed description of their proposed system, including system architecture (WANs, LANs, etc.), workstations, controllers, sensors, field panels, and wiring.

Nine Steps to BAS Commissioning

1. Develop owner's design intent.
2. Develop commissioning plan and specifications.
3. Select contractor/vendor.
4. Complete verification testing.
5. Complete functional performance testing.
6. Develop systems manual.
7. Complete operator and user training.
8. Accomplish ongoing system optimization.
9. Complete final commissioning report for continuous improvement.

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SOURCES SOUGHT AND LONG RANGE OPPORTUNITIES

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124) **EXPANDING BIDDERS** ' LIST The Federal Aviation Administration, Southwest Regional Headquarters in Fort Worth, Texas, is accepting applications from potential **vendors** to be prequalified and added to the **bidders** ' mailing list to receive upcoming offers. All areas of procurement are being considered, including construction, supplies and services. Applications received by April 1, 1997, will be reviewed and processed by July 1, but applications received after April 1 will not be reviewed until October. Applications are reviewed quarterly. Fax your request to Ms. Cheryl Thomas, 817/222-5994. The FAA Southwest Region's Internet home page is at <http://users.why.net/SWCONTRACTS>. Mailing address is Dept. of Transportation, Federal Aviation Administration, 2601 Meacham Blvd., Fort Worth, TX 76193-0055. 125) **SOURCES SOUGHT/POTENTIAL 8(a) SET-ASIDE** The Military Sealift Command is seeking educational support services for afloat staffs and the Merchant Ship Naval Augmentation Program (MSNAP). These services include curricula design, development, modification and implementation. Resident courses will be taught at Navy Supply Corps School (NSCS), Athens, Georgia and Naval Weapons Station School (NWS), Earle, New Jersey. The courses will utilize the government-approved Program of Instruction (POI). Nonresident courses composed of any one or combination of the above modules may be required for instruction at a designated worldwide location (afloat and/or ashore). Courses to be taught are composed of the following modules SUADPS/UNREP-RT, Supply Management Special Accounting Course (SAC) 224, Coordinated Shipboard Allowance List (COSAL)/Configuration Management, Fleet Freight, Fuels Management, Hazardous Materials (HAZMAT), Food Service Management, Exchange Location, Explosive Cargo Handling & Stowage, Explosive Handling Operators, Modular Cargo Delivery Underway Replenishment (UNREP) Operations, MCDS Maintenance & Start-Up Procedures, Module Fuel Delivery System (MFDS) Refueling-At-Sea Operations, Virtual Reality Yard & Stay Vertical Pallet Lifter (VPL) and Healthy Heart Training. Interested 8(a)-certified firms should request the RFP as soon as possible. The due date is March 21, 1997. Contact Bob Link 202/685-5959. fax 202/685-5264, email Bob.Link@smtpgw.msc.navy.mil. Contracting Officer Military Sealift Command, N103, 901 M Street, Washington, DC 20398-5540. SOL N00033-97-R-8010. 126) Brooks Air Force Base in Texas is preparing an OMB A-76 cost conversion study for possible upcoming contracts. It is seeking sources to provide certain laboratory support services to the Armstrong Lab. Services include 1) visual information, such as recording, photography, **computer** illustration, library products, videoconferences, documentation of accidents, crime scenes and medical procedures, and sworn testimony; 2) prototype design and fabrication; 3) facilities management, including engineering support, project monitoring, environmental compliance, and maintenance for about 50 buildings; 4) medical equipment maintenance. This study will not result in a contract, but is to be used for planning purposes for possible future contracts. Interested firms should submit a capabilities statement including 1) your technical capabilities, expertise and security clearances; 2) professional experience in the past five years; 3) expertise and resumes of key personnel; 4) declaration of whether your company and

perform all four services and **description** of possible teaming partners if not; 5) **description** of other unique capabilities; 6) business classification (small, large, disadvantaged, etc.) under SIC Code 7389; 7) your property control system; 8) **description** of your accounting system and compliance with cost accounting standards (contract format being considered is firm-fixed-price); 8) your CAGE Code and DUNS number. Statements are limited to 25 pages, not including resumes, and are due by the end of February. Contact J. Rosales, 210/536-6213, with all technical and contractual questions. HSC/PKO, 8005 9th St., Bldg. 625, Brooks AFB, TX 78235-5353. 127) VA REQUESTS CAPES STATEMENTS FROM SMALL BUSINESSES The Dept. of Veterans Affairs last month declared its upcoming Procurement of Automated Information Resources Solutions (PAIRS) a total small business set-aside. The VA Office of Small and Disadvantaged Business Utilization is now asking small businesses to submit capabilities statements. VA announced it has received a delegation of procurement authority of \$875 million for this procurement. PAIRS is a nation-wide support services requirement covering site surveys, systems analysis, wiring and cabling, **networking**, integration, software engineering, deinstallation, maintenance, program management and training, and other services. The SIC Code is 7379. At least two small business prime contractors, possibly three, will be selected. PAIRS is a companion procurement to the Procurement for **Computer Hardware** and Software (PCHS, or "peaches") issued in 1996. A draft solicitation for PAIRS is expected to be issued in April 1997. Check the PAIRS Internet home page, <http://www.va.gov/oirm/procurement/pairpage.htm>. In your capes statement, include your company capabilities, previous comparable experience and the SIC Code you think appropriate for this project if you disagree with the 7379 designation. Contact Jim Dunning at 202/565-8124 or 800/949-8387. Fax, 202/565-8156. E-mail, dunjam@mail.va.gov. The contracting officer is Judith Sterne, 202/273-8792. Dept. of Veterans Affairs, 810 Vermont Ave., NW (93A), Washington, DC 20420. 128) STATEMENTS UNDER REVIEW The Ballistic Missile Defense Organization (BMDO) is reviewing capabilities statements it requested for system engineering and technology assistance (SETA) services for its Science and Technology Directorate (BMDO/TRI). This requirement is being considered as a small business set-aside under SIC Code 8731, 1,000-employee size standard. A final determination will be based on an assessment of statements received following a request issued Dec. 19, 1996. An RFP will follow, with award planned by June 1997. The contractor will give advice and recommendations to a number of BMDO research and development projects based on literature searches and reviews. The contractor will also advise the BMDO project integrator on technical and financial implications and risks associated with planning, scheduling and setting performance goals. BMDO/TRI's technologies are packaged in two broad-based fields 1) electronics, optics, communications, nonlinear optical materials and processes, and intercept enhancement technologies; and 2) power systems, power conditioning, ground-based radar, propulsion and propellants. This requirement may be split into two contracts. Particular areas in which the contractor must show technical expertise include: 1) electronic and optics in signal processing for laser communications, material sciences, including organic, polymeric, and solid-state chemistry related to nonlinear processes and integrated circuit packaging, spectroscopy related to laser technology, neural **network** architectures, sensor information processing for detection, discrimination, target recognition, tracking, and intercept enhancement; 2) space power and power conditioning technology, propulsion concepts and advanced propellant technologies, radar technology and engineering for command, control, communication, and **computers** to conduct space experiments, technology for data collection from remote platforms, and phenomenology studies. Information, including a draft statement of work and future RFP information, will be posted on the BMDO Acquisition Reporting Bulletin Board (BARBB). Dial 703/769-8394 from a modem for access. On the Internet, go to <http://www.acq.osd.mil/bmdo/barbb/barbb.htm>. An estimated due date is March 31, 1997. Contact Karen Byrd, 703/604-4458. Ballistic Missile Defense Organization (BMDO), 1725 Jefferson Davis Highway, Suite 809, Arlington, VA 22202. Reference No. BMDO 97-06. SOL

HQ0006-97-R-0008. 129) GET ON THE BIDDERS ' LIST The Ballistic Missile Defense Organization (BMDO) is compiling a **bidders ' list** for an upcoming requirement for technical, programmatic, and administrative services to support the Cost Estimating and Analysis Directorate. This requirement is set-aside for small business under SIC Code 8731, 1,000-employee size standard. Required services will include 1) development and maintenance of current cost, technical, performance, and economic databases; 2) development and maintenance of a library of cost and cost performance trade methodologies and approaches; and 3) development and maintenance of cost estimating, cost risk, and program budget models. A cost-plus-fixed-fee, level of effort (task order) contract is expected, with a two-year base and two one-year options. Award is planned for May 1997. Information about this requirement will be posted on the BMDO Acquisition Reporting Bulletin Board (BARBB). On the Internet, go to <http://www.acq.osd.mil/bmdo/barbb/barbb.htm>. Submit requests to get on the **bidders ' list** quickly. Contact Anne Terry, 703/604-4459. Ballistic Missile Defense Organization/DCT, 1725 Jefferson Davis Highway, Suite 1200, Arlington, VA 22202. Reference No. BMDO 97-07. 130) ARSENAL CONSIDERS PRIVATIZING Pine Bluff Arsenal in Arkansas is considering the privatization of its utilities operations -- electrical, natural gas, potable water, sanitary sewer, steam and compressed air systems -- and is looking for potential sources to provide for the distribution of utilities and maintenance of systems. This is the initial phase of a privatization study. Submit your capabilities and state whether you are a small or large business. There is no request for proposals at this time. Contact James Sandstrum, 501/540-3270. Commander, PBA, SIOPB-PO, Attn James Sandstrum, 10020 Kabrich Circle, Pine Bluff, AR 71602-9500. Tracking number is DAAA03-97-P1000. 131) MANAGEMENT TRAINING FIRMS WANTED The Internal Revenue Service wants to hear from companies capable of providing **computer** -based management training on various topics, including planning, scheduling, prioritizing, time management, communication skills, performance discussions, delegation, empowerment, managing diversity, leading in a changing environment, interest-based problem solving, remote management, coaching, risk taking, decision making, team building, situational leadership. Send descriptive literature and brochures along with **computer** system specifications, but don't send any products. IRS will invite companies for samples or demonstrations. The applicable SIC Code is 7322, \$5-million size standard. Indicate your business size (small, large, disadvantaged). Write to Gerald Kyler, fax 202/283-1514. IRS, A/C Procurement MP, 7th floor, Constellation Centre, 6009 Oxon Hill Road, Oxon Hill, MD 20745. 132) SMALL BUSINESS OPPORTUNITIES WITH THE AIR FORCE The Air Force Materiel Systems Group (MSG) plans to consolidate 45 existing contracts into two omnibus contracts worth \$490 million. Multiple prime contracts will be awarded under both the \$315-million Technical Omnibus Contract (TOC) and the \$175-million Support Omnibus Contract (SOC). The TOC requirement includes a subcontracting goal of 20% to small businesses and 8(a) firms. The SOC requirement will contain some special set-aside provisions for small businesses and 8(a) firms. The objective of the TOC is to maintain, sustain and re-engineer older and newer technologies so that they will be able to communicate with one another. Its scope includes integration, hardware and software maintenance, proof of concept, programming, prototyping, modifications, enhancements, reverse engineering, system analysis and engineering, telecommunications support, logistics analysis/engineering, IV&V testing, process modeling, studies and analysis, report generation, re-engineering support, software documentation, configuration management, and training. It does not include development of new systems. The SOC will serve a wide variety of requirements at the MSG's seven directorates and four operating locations, based at Air Logistics Centers. Its scope includes configuration management, technical writing, graphics support, administrative support, cost and budget analysis, acquisition support, business area consultants, studies, report generation, training, business process identification, modeling and improvement, schedule generation, and analysis. The SIC Code for these procurements is 7379. The Air Force will conduct a preliminary **qualification** screening

process to determine the "best qualified" contractors. Past performance verification will be part of the qualification screening. Firms deemed best qualified will be invited to help develop the final RFPs. Both large and small firms will have to go through the initial screening. The Air Force will use the Internet extensively to broadcast information about the Omnibus contracts, and recommends contractors to check sites weekly. The central point is the Omnibus Home Page, at <http://www.afmc.wpafb.af.mil/organizations/MSG/orgs/SZ/OMNIBUS/>. Contract award is planned for summer 1997. Contact points are Jerry Duke, MSG Omnibus Acquisition Office Chief, ESC MSG/SZS, 4225 Logistics Ave., Suite 20, Wright-Patterson AFB, OH 45433-5759. Phone, 937-257-0509. Fax, 937-656-0881. E-mail, jduke@wpgatel.wpafb.af.mil. Patricia Kittles, MSG Omnibus Contracting Officer, ESC MSG/PKA, 4375 Chidlaw Road, Room C022, Wright-Patterson AFB, OH 45433-5006. Phone, 937-257-3439. Fax, 937-257-4009. E-mail, kittles@wpgatel.wpafb.af.mil. 133) FTS2001 UPDATE -- PROPOSALS DUE Proposals were due last week for the technical and management services (TMS) portion of the FTS2001 telecommunications requirement issued by the General Services Administration (GSA). Next up is an even larger requirement, for world-wide telecommunications support. No portion of that contract will be set-aside, but subcontracting opportunities are expected. Keep an eye on GSA's Internet site for telecommunications opportunities, at <http://post.fts2k.gsa.gov>. 134) FULL SET-ASIDE NASA/Goddard Space Flight Center has planned a research/development project to be released during the third quarter of fiscal year 1997. They are in need of support services for planetary astrophysics research and development activities. The value of the project is estimated to be between \$100,000 and \$1 million. The product and service code is D308. The point of contact is V. Kunde 301/2836-5693. 135) MARKET RESEARCH FOR SMALL BUSINESS, 8(a): The Air Force's Aeronautical Systems Center (ASC), located at Wright-Patterson AFB in Dayton, Ohio, is conducting market research. ASC is considering a consolidation of about 20 contracts for technical and management support services into one "omnibus manpower support contract" under which it will award between five and eight contracts. The omnibus contract has a potential value of \$400 million. The current contractors are all small businesses and 8(a) firms. ASC wants to hear from small businesses and 8(a) firms capable of providing all of the requirements under the planned omnibus procurement. Contractors will have to be able to provide all the requirements to be eligible to bid. Services to be required under the omnibus contract will include engineering, manufacturing, acquisition logistics, acquisition management, management operations, test and evaluation, acquisition security, configuration/data management, GFP management, and financial management. Prime contractors will have to perform at least 50% of the work specified in the contract, will be required to have secret facility clearance, and, upon award, establish an office within 25 miles of Wright-Patterson AFB. Contractors will be awarded time-and-materials indefinite delivery, indefinite quantity contracts for a five-year period. Individual task orders will vary from supporting any phase of ASC weapons system acquisition (such as development, production and support) to base-wide staff activities such as cost research and modeling, economic analysis and specialized training. Small and 8(a) firms interested in this opportunity should submit a capabilities statement of no more than 40 pages including the date your company was established, number of employees, annual revenues for the past two years, current business base and graduation date from the 8(a) program (if 8(a)). You should describe technical capabilities by including a company experience matrix for calendar years 1994-1996. Correlate each technical/management support area with a contract/order number, customer name, man-years of support in each of the support areas, and location of effort. Also include a description of the your technical equipment, facilities and resources, and discuss ways to meet ASC requirements. Contact Lt. Col. Scott Lang or Frieda Thornton, 937/255-7003. Send statements to LTC Scott Lang, ASC/CDSK, Bldg. 22N, 2690 C St., Room N222, Wright-Patterson AFB, OH 45433-7407. An ombudsman has been named. He is Daniel L. Kugel, 937/255-3855. ASC/SY, Bldg. 52, 2475 K St., Suite 1, Wright-Patterson AFB, OH 45433-7642.

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